

AMENDMENTS TO THE CLAIMS

1-8. (Canceled)

9. (Currently amended) An imaging system, comprising:

an active pixel image sensor array disposed on a substrate, said array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

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a plurality of digital memory array arrays disposed on said substrate for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in at least one of said digital memory ~~array~~ arrays.

10. (Previously Presented) The imaging system of claim 9, wherein said active pixel image sensor array is a CMOS image sensor.

11. (Previously Presented) The imaging system of claim 9, wherein said at least one analog to digital converter is an oversampling converter.

12. (Previously Presented) The imaging system of claim 9, further comprising an analog signal processor including column analog double sampling circuitry.

13. (Previously Presented) The imaging system of claim 12, wherein said column analog double sampling circuitry samples both a signal and a reference for decreasing pixel fixed pattern noise.

14. (Previously Presented) The imaging system of claim 12, wherein said analog signal processor further comprises at least one preamplifier with adjustable gain.

15. (Previously Presented) The imaging system of claim 9, wherein said at least one analog to digital converter comprises a column analog to digital converter for each pixel column of said active pixel image sensor array.

16. (Currently amended) The imaging system of claim 9, further comprising at least one digital signal processor coupled between said at least one analog to digital converter and said one of said plurality of digital memory array arrays.

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17. (Currently amended) The imaging system of claim 16, wherein stored multiple sampled digital values for each pixel stored in said one of said plurality of digital memory array arrays are used to provide an integrated output signal for said each pixel.

18. (Currently amended) A method of acquiring an image, comprising:

~~forming an active pixel image sensor array on a semiconductor substrate;~~

using ~~said an~~ active pixel image sensor array including a plurality of pixels to image a scene and to produce analog image output information said active pixel image sensor array being disposed on a semiconductor substrate;

sampling and converting ~~an~~ said analog ~~output signal representing incident light for each image information for a first~~ pixel of said active pixel image sensor array ~~to a digital value for each frame of the image a plurality of times during a desired integration period~~ to produce a first plurality of digital values; and

storing ~~each of the~~ said first plurality of digital values in a first digital memory, said first digital memory being disposed on said semiconductor substrate;

sampling and converting said analog image information for a second pixel of said active pixel image sensor array a plurality of times during a desired integration period to produce a second plurality of digital values; and

storing said second plurality of digital values in a second digital memory, said second digital memory being disposed on said semiconductor substrate.

19. (Previously Presented) The method of claim 18, wherein said active pixel image sensor array is a CMOS image sensor.

20. (Currently amended) The method of claim 18, further comprising using the stored digital values for each pixel to produce ~~an~~ a respective integrated pixel output signal for said integration period.

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21. (Currently amended) A semiconductor chip, comprising:

a substrate comprising:

an active pixel image sensor array comprising a plurality of pixels;

at least one analog to digital converter for sampling and converting analog information from pixels in said array to digital values; and

a plurality of digital memory ~~array~~ arrays for storing and accumulating said digital values;

wherein each pixel in said active pixel image sensor array is sampled multiple times during an integration period and each sampled value is stored in at least one of said digital memory ~~array~~ arrays.

22. (New) An imaging system as defined in claim 9 wherein said plurality of digital memory arrays comprises two digital memory arrays.

23. (New) An imaging system as defined in claim 22 wherein said two digital memory arrays are disposed on opposite sides of said active pixel image sensor array.

24. (New) A method of acquiring an image as defined in claim 18 further comprising:

integrating said first and second pluralities of digital values to produce a first integrated value and a second integrated value respectively.

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25. (New) A method of acquiring an image as defined in claim 18 wherein said first and second digital memories are disposed on opposite sides of said active pixel image sensor array.

26. (New) A semiconductor chip as defined in claim 21 wherein said substrate further comprises:

an analog signal processor coupled to at least one pixel of said plurality of pixels of said active pixel image sensor array; and

a digital signal processor coupled to said analog signal processor and coupled to at least one array of said plurality of digital memory arrays.
